

IN THE CLAIMS

Please amend claims 1, 12, 13, 15, 20-22, 27, 34, 38, 39, 41, 43-45, 52, 53, and 58-60 as follows.

Please cancel claims 11, 14, 37, 40, and 57 without prejudice.

1. (currently amended) An etching method comprising:  
loading a workpiece into an etching chamber, the workpiece microstructure comprising a first area to be removed by a spontaneous vapor phase chemical etchant and a second area to remain after the first area being removed, wherein the second area comprises an intermetallic compound;  
providing the spontaneous vapor phase etchant to the etching chamber; and  
removing the first area while leaving behind the second area; and  
wherein the chemical etchant comprises a chemical species that is selected from the group consisting of: interhalogens and noble gas halides.
2. (original) The method of claim 1, wherein the intermetallic compound comprises an early transition metal selected from column 4 in the periodic table.
3. (original) The method of claim 1, wherein the intermetallic compound comprises an element that is Tc or Re.
4. (original) The method of claim 1, wherein the intermetallic compound comprises an element that is a late transition metal.
5. (original) The method of claim 4, wherein the intermetallic compound comprises an element that is Ru, Rh, Os, Ir, or Pt.
6. (original) The method of claim 1, wherein the intermetallic material is selected from the group consisting of  $\text{NiAl}_x$  and  $\text{TiNi}_x$ .
7. (original) The method of claim 1, wherein the intermetallic material is  $\text{VAl}_x$ ,  $\text{WTe}_x$ ,  $\text{TiFe}_x$ ,  $\text{TiPd}_x$ ,  $\text{AlPd}_x$ ,  $\text{MoPd}_x$ ,  $\text{MoNi}_x$ ,  $\text{MoFe}_x$ ,  $\text{CoCr}_x$ ,  $\text{CoMn}_x$ ,  $\text{NiW}_x$ ,  $\text{NiV}_x$ ,  $\text{NiTi}_x\text{Al}_y$ ,  $\text{NbAl}_x$ ,  $\text{MoPd}_x$ ,  $\text{AlCu}_x$ ,  $\text{CuZn}_x$ , or  $\text{TaAl}_x$ .
8. (original) The method of claim 1, wherein the first area comprises a material that is elemental

metal, metalloid, metal alloy, metal silicide,  $W_xN$  or  $TaN_x$ .

9. (original) The method of claim 1, wherein the workpiece is a micromirror array.
10. (original) The method of claim 1, wherein the workpiece is a microelectromechanical device.
11. (cancelled).
12. (currently amended) The method of claim 1 ~~11~~, wherein the interhalogen comprises bromine trifluoride.
13. (currently amended) The method of claim 1 ~~11~~, wherein the noble gas halide comprises xenon difluoride.
14. (cancelled).
15. (currently amended) The method of claim 1 ~~11~~, wherein vapor phase etchant further comprises a diluent gas that is a noble gas.
16. (original) The method of claim 1, wherein the workpiece is a microstructure comprising a silicon substrate.
17. (original) The method of claim 16, wherein the first area comprises amorphous silicon; and wherein the microstructure further comprises a structural layer and a barrier layer disposed between the structural layer and the first area.
18. (original) The method of claim 16, further comprising: removing the barrier layer disposed between the structural layer and the first area.
19. (original) The method of claim 1, wherein the second area further comprises O or N.
20. (currently amended) The method of claim 19 ~~16~~, wherein the O or N in the second area is 15 atomic % or less in weight.

Attorney Docket No. P119-US

21. (currently amended) The method of claim ~~19~~ 16, wherein the O or N in the second area is 5% atomic or less in weight.
22. (currently amended) The method of claim ~~19~~ 16,, wherein O or N in the second area is in a form of  $\text{TiO}_x$ ,  $\text{TiN}_x$ ,  $\text{AlO}_x$  or  $\text{AlN}_x$ .
23. (original) The method of claim 1, wherein the intermetallic compound comprises an early transition metal selected from column 5 in the periodic table.
24. (original) The method of claim 1, wherein the intermetallic compound comprises an early transition metal selected from column 6 in the periodic table.
25. (original) The method of claim 1, wherein the intermetallic compound is  $\text{AlTi}_x$ .
26. (original) The method of claim 25, wherein the workpiece further comprises a barrier layer that remains after removal of the first area.
27. (currently amended) A method comprising:
  - forming a workpiece, comprising:
    - providing a substrate;
    - depositing a first and second sacrificial layer on the substrate; and
    - forming a first and second structural layers on the sacrificial layers, wherein the first and second structural layers comprises an intermetallic compound;
  - loading the workpiece to an etching chamber; and
  - removing at least a portion of the first and second sacrificial layers using a spontaneous vapor phase chemical etchant, wherein the chemical etchant comprises a chemical species that is selected from the group consisting of: interhalogens and noble gas halides.
28. (original) The method of claim 27, wherein the intermetallic compound comprises an early transition metal selected from column 4 in the periodic table.
29. (original) The method of claim 27, wherein the intermetallic compound comprises an element that

Attorney Docket No. P119-US

is Tc or Re.

30. (original) The method of claim 27, wherein the intermetallic compound comprises an element that is a late transition metal.
31. (original) The method of claim 30, wherein the intermetallic compound comprises an element that is Ru, Rh, Os, Ir, or Pt.
32. (original) The method of claim 27, wherein the intermetallic material is selected from the group consisting of  $Ni_xAl_y$  and TiNi.
33. (original) The method of claim 27, wherein the intermetallic material is  $VAl_x$ ,  $WTe_x$ ,  $TiFe_x$ ,  $TiPd_x$ ,  $AlPd_x$ ,  $MoPd_x$ ,  $MoNi_x$ ,  $MoFe_x$ ,  $CoCr_x$ ,  $CoMn_x$ ,  $NiW_x$ ,  $NiV_x$ ,  $NiTi_xAl_y$ ,  $NbAl_x$ ,  $MoPd_x$ ,  $AlCu_x$ ,  $CuZn_x$ , or  $TaAl_x$ .
34. (currently amended) The method of claim 27, wherein the first or the second sacrificial layer area comprises a material that is elemental metal, metalloid, metal alloy, metal silicide,  $W_xN$  or  $TaN_x$ .
35. (original) The method of claim 27, wherein the workpiece is a micromirror array.
36. (original) The method of claim 27, wherein the workpiece is a microelectromechanical device.
37. (cancelled).
38. (currently amended) The method of claim 27 ~~37~~, wherein the interhalogen comprises bromine trifluoride.
39. (currently amended) The method of claim 27 ~~37~~, wherein the noble gas halide comprises xenon difluoride.
40. (cancelled)
41. (currently amended) The method of claim 27 ~~37~~, wherein vapor phase etchant further comprises a

*diluent gas that is a noble gas.*

42. (original) The method of claim 27, wherein the workpiece is a microstructure comprising a silicon substrate.
43. (currently amended) The method of claim 42, wherein the first or the second sacrificial layer area comprises amorphous silicon; and wherein the microstructure further comprises ~~a structural layer and a barrier layer disposed between one of the first and second the structural layers layer and one of the first and second sacrificial layers the first area.~~
44. (currently amended) The method of claim 43, further comprising: removing the barrier layer ~~disposed between the structural layer and the first area.~~
45. (currently amended) The method of claim 27, wherein the first or the second structural layer area further comprises O or N.
46. (original) The method of claim 45, wherein the O or N in the second area is 15 atomic % or less in weight.
47. (original) The method of claim 45, wherein the O or N in the second area is 5 atomic % or less in weight.
48. (original) The method of claim 45, wherein O or N in the second area is in a form of  $\text{TiO}_x$ ,  $\text{TiN}_x$ ,  $\text{AlO}_x$  or  $\text{AlN}_x$ .
49. (original) The method of claim 27, wherein the intermetallic compound comprises an early transition metal selected from column 5 in the periodic table.
50. (original) The method of claim 27, wherein the intermetallic compound comprises an early transition metal selected from column 6 in the periodic table.
51. (original) The method of claim 27, wherein the intermetallic compound is  $\text{AlTi}_x$ .

Attorney Docket No. P119-US

52. (currently amended) The method of claim 51, wherein the workpiece further comprises a barrier layer that remains after removal of the first and second sacrificial layers first area.
53. (currently amended) A method for making a microstructure, the method comprising:  
depositing a sacrificial material on a substrate, the sacrificial material comprising a metal;  
depositing a structural layer after depositing the sacrificial material, wherein the structural layer comprises a material other than the sacrificial material, and wherein the material of the structural layer comprises an intermetallic compound; and  
removing the sacrificial material with a spontaneous vapor phase chemical etchant, wherein the chemical etchant comprises a chemical species that is selected from the group consisting of: interhalogens and noble gas halides.
54. (original) The method of claim 53, wherein the sacrificial material comprises at least 25 percent in weight of said metal.
55. (original) The method of claim 53, wherein the sacrificial material comprises at least 50 percent in weight of said metal.
56. (original) The method of claim 53, wherein the sacrificial material comprises at least 90 percent in weight of said metal.
57. (cancelled).
58. (currently amended) The method of claim 53 57, wherein the interhalogen comprises bromine trifluoride.
59. (currently amended) The method of claim 53 57, wherein the noble gas halide comprises xenon difluoride.
60. (currently amended) The method of claim 53 57, wherein the etchant is mixed with a diluent gas that is He, N<sub>2</sub>, Ne, Ar, Kr, or Xe.
61. (original) The method of claim 59, wherein the metal of the sacrificial material is a transition

metal that is an early transition metal.

62. (original) The method of claim 61, wherein the metal is a sputtered elemental metal material.